



# South Coast Air Quality Management District

21865 Copley Drive, Diamond Bar, CA 91765-4178  
(909) 396-2000 • www.aqmd.gov

*Office of the Executive Officer  
Barry R. Wallerstein, D.Env.  
909.396.2100, fax 909.396.3340*

March 25, 2008

Mr. James Goldstene  
Executive Officer  
California Air Resources Board  
1001 "I" Street  
Sacramento, CA 95814

Dear Mr. Goldstene:

## South Coast AQMD Staff Comments Regarding the 2008 Proposed Amendments to the California Zero Emission Vehicle Program Regulations

The California Zero Emission Vehicle (ZEV) Regulation remains an important component to meet federal ambient air quality standards in the South Coast Air Basin as well as providing technology innovation throughout the state as well as the nation. The South Coast Air Quality Management District (AQMD) staff recognizes the difficulty in making changes to this complex regulation and applauds CARB staff on addressing the current state-of-technology of ZEVs. We feel, however, the ZEV regulation has become overly burdened with incremental modifications which have diluted its main goal of improving air quality through accelerating the deployment of clean vehicle technologies. As such, AQMD staff believes that the proposed amendments need to be further strengthened. The following are our specific comments in order of priority.

### Adjust Credits for AT PZEVs

AQMD staff agrees with the need for adjusting the regulation to accommodate the new plug-in hybrid electric vehicle (PHEV) architectures. However, as mentioned previously, the currency for equating enhanced advanced technology partial zero-emission vehicles (ATPZEVs) and foregone ZEVs are based on incremental technology characteristics and not air quality gains. CARB staff suggests that the large number of enhanced ATPZEVs

(approximately 75,000 in the stated scenario) would result in *lifetime* criteria pollutant reductions compared to the existing (25,000 ZEV) requirement. AQMD staff believes that this trade-off of 75,000 enhanced ATPZEV (0.02 g/mile NO<sub>x</sub> emissions) does not go far enough to make up for the foregone zero-emission vehicles simply because the South Coast Air Basin needs emission reductions now, not over a 150,000 mile vehicle lifetime.

Acknowledging the near-term technology challenges with commercializing ZEVs (battery-electric and fuel cell vehicles), AQMD staff therefore urges a higher number of enhanced ATPZEVs as the backfill. CARB staff recommends 75,000 enhanced ATPZEVs *over three years* by 2014, which is low given the number of hybrids sold in California for 2007 was 74,737 (R. L. Polk and Co., Hybridcars.com). In order to reflect this demand and the rapid technology advancements, **we recommend a 50% increase in the number enhanced ATPZEVs (e.g., 112,500) in order to accelerate battery technology development, manufacturing investment, and further air quality reductions through vehicle replacements.**

#### Creation of a "New Path" for 2012

AQMD staff supports the overall efforts to simplify the structure of the program with the "New Path" starting in 2012. However, we remain concerned with the order-of-magnitude reduction in the total number of ZEVs for Phase III (i.e., reduced from 25,000 to 2,500). As you are aware, South Coast Air Basin residents are subject to the worst air quality in the nation, so any reduction in the number of clean technologies in our region is troubling. Further, delays in high numbers of vehicles (25,000) can have a significant impact to our local communities. Although we support the "backfilling" with enhanced ATPZEVs, such as plug-in hybrid electric vehicles, we are concerned by the equivalency applied to arrive at the backfilled number of vehicles. The approach is confusing and based on incremental technology credits rather than air quality, which results in trading ZEVs for 0.02 g/mile NO<sub>x</sub> vehicles (enhanced ATPZEVs). **We recommend that the enhanced ATPZEVs with the lowest emissions be rewarded with higher credits.** For example, several existing ATPZEVs are currently certified at 0.01 g/mile NO<sub>x</sub>, 50% below the certification standard and such vehicles should be awarded higher credits.

We are further concerned that the drive cycle required to establish the zero-emission range credits has yet to be developed. Since an established, accepted and fully vetted drive-cycle which accurately reflects in-use driving patterns and emissions is not yet available, **we recommend the electric-range credit structure be replaced with a useable energy approach**, e.g., kWh, as we previously proposed in our July 2007 letter commenting on the staff concept paper (attached).

#### Provide More Equal Treatment of Battery Electric Vehicles

We agree with the Expert Panel conclusion that a plug-in hybrid fuel cell vehicle may be the optimal marriage of technologies in the future. Such a vehicle under the proposed changes would be considered a Type III due to the long battery recharge time. **We rec-**

**ommend that this type of architecture be as highly rated as a Type IV fuel cell-only vehicle and be given the same number of credits as the Type IV vehicles.**

Extend "Travel" Provision

AQMD staff continues to be concerned with the Travel Provision as it has the potential to further erode the Phase III targets by placing true ZEVs in other states. It is difficult to rationalize and justify to the public that clean air goals established in California are being fulfilled outside the state. If the Travel Provision is extended, **we recommend a compensatory trade-off to ensure the foregone emissions benefits are realized.** The burden of adapting California's regulation in other states should be placed on those states.

We look forward to CARB articulating a comprehensive vision, including the ZEV regulation, for achieving air quality across the state, but specifically in the South Coast Air Basin. We further look forward to working with CARB in achieving these goals. Please contact me or Dr. Matt Miyasato, Assistant Deputy Executive Officer – Technology Advancement Office at (909) 396-3249, if you have any questions or would like to further discuss our comments in more detail.

Sincerely,



Barry R. Wallerstein, D.Env.  
Executive Officer

CSL:MMM:LHM

Attachment

## **ATTACHMENT**



# South Coast Air Quality Management District

21865 Copley Drive, Diamond Bar, CA 91765-4178  
(909) 396-2000 • www.aqmd.gov

August 22, 2007

Tony Andreoni, Manager  
Zero-Emission Vehicle Implementation Section  
California Air Resources Board  
1001 "I" Street, 23<sup>rd</sup> Floor  
Sacramento, CA 95814

Subject: Comments on the Concept Paper dated July 24, 2007 proposing options to amend the Zero Emission Vehicle Regulation

Dear Mr. *TONY* Andreoni:

The California Zero Emission Vehicle (ZEV) Regulation is an important component of our joint strategy to meet the federal air quality standards. We are encouraged by the number of PZEVs and ATPZEVs currently available, as well as the progress being demonstrated by hydrogen fueled ZEVs and near-ZEVs. Fuel cell vehicle technology, however, has not achieved the progress and penetration envisioned in the earlier modification to the regulation. And because the AQMD has the greatest air quality challenge in California, we aggressively support changes to the ZEV regulation to accelerate the deployment of the cleanest possible vehicles, especially in the South Coast Air Basin. It is in this spirit that we offer the following input to the issues as outlined in your staff's July 24, 2007 "Concept Paper."

#### Topic A: Alternative Path Volume Requirements

AQMD staff agrees that the onset of Phase III (25,000 vehicles) may need to be postponed while technologies, such as the plug-in hybrid fuel cell vehicle and fuel cell stacks, have time to mature to the appropriate durability and cost targets. Our main concern echoes one expressed in the CARB Board Resolution 07-18 that there be no backsliding to the program. As such, we request that if Phase III is delayed, an appropriate backfill is provided, e.g. as ATPZEVs in order to maintain the air quality benefits from the foregone ZEVs.

#### Topic B: Type IV ZEV Definition

CARB staff has proposed an additional Type IV category to further incentivize technology advancement. AQMD staff agrees with the concept but suggests an additional intermediate Type that rewards 200 mile range plug-in and battery technology without requiring fast refill. Long-range and fast-fill may not be needed together, at least in the near-term. Table 1 outlines AQMD staff recommendations with likely technologies in each type category.

Table 1: AQMD Proposed ZEV Types

Type	Minimum Range	10 minute Fast Refill	Technology
I	50 miles	No	City EV
II	100 miles	No	BEV
III	100 miles	Yes	FCV, BEV
<i>III+</i>	<i>200 miles</i>	<i>No</i>	<i>PHFCV, BEV</i>
IV	200 miles	Yes	FCV, BEV

Creating the Type III+ category would allow a plug-in hybrid fuel cell vehicle (PHFCV) without fast-charging of the battery. Although recent reports indicate the potential for fast charging lithium ion batteries, the near-term benefits of a non-fast charge PHFCV should be rewarded in addition to the proposed Type IV ZEV. Two large manufacturers have publicly announced PHFCV concepts, and the DOE has suggested PHFCVs as a means to overcoming current fuel cell durability limitations. As such, the proposed Type III+ and IV categories should be given more credit than the lower Type ZEVs in the alternative path.

#### Topic C: Use of BEV in Alternative Path

Aligned with our concern to ensure the cleanest vehicles are more rapidly deployed, we support the CARB staff proposal to remove the cap for full performance BEVs and provide an equity ratio (1:1) to fuel cell vehicles. This incentive for Type II BEVs may actually help the development of Type III and higher ZEVs by accelerating the learning curve for battery durability and power management.

#### Topic D: ZEV Credit Levels

Without knowing the ZEV credits banked by the large manufacturers, it is difficult to comment on the phase out of credits for each type of ZEV. In general, however, the credit decrease should correspond and compliment the phases of ZEV rollout identified for the alternative path (Topic A). Further, we recommend that Type III+ and IV ZEVs receive more credits than Type III ZEVs.

#### Topic E: Plug-in Hybrid Electric Vehicles (PHEVs)

AQMD staff agrees with the ZEV Expert Panel Review, which indicated that blended mode PHEVs have “the potential to provide significant direct societal benefits” and that requiring all electric range (AER) “could have a significant [detrimental] impact on the early success of the technology” (Executive Summary, p11). AQMD staff makes the following recommendations for CARB to consider:

- Reducing the AER threshold from 10 to 5 miles is not as significant as providing credit for blended PHEVs based on useable energy (e.g., kWh). A PHEV cycle will need to be developed as a standard to define “usable” energy as opposed to the Urban AER as currently defined in the regulation.
- Adjust the warranty requirement to 5 years instead of 10 years, which would be similar to early BEV requirements. An incentive program with the state, utilities and local governments could be marshalled to also allay concerns regarding battery lifetime.

- Establish a “Silver +” category as proposed by CARB staff to encourage PHEV development and deployment. Allow Silver + vehicles to backfill the gold category until Phase IV. This temporary backfill could be based on equivalent kWh, e.g., 1 FCV (or 27 kWh BEV) = 3 blended PHEVs which have 9 kWh useable energy.

#### Topic F: ATPZEV Credits

CARB staff question whether ATPZEV credits should be extended to 2014 (Phase III). As with previous comments, AQMD staff recommends the incentive credits align with the rollout modifications reflected in Topic A. Should the Phases be delayed, then it would be appropriate to maintain the credit structure consistent with the timing of the vehicle introductions and extend the existing structure out to 2014.

In order to assist in the transparency of the credit structure, a full table of proposed ATPZEV credits is more useful rather than just the advanced component credits as identified in Table VIII of the Concept Paper. Expanding CARB staff suggestion of a Silver + category, AQMD staff recommends additional credits for an alternative blended ZER, grid charging, and fast charging incentives. An example of how the credits might be allocated for the different technologies is shown in Table 2.

Table 2: ATPZEV Credits (2009-2014)

Technology	PZEV	ZER	Advanced Component				Low Fuel Cycle Emissions	Total
			Tanks	High V	Plug	Fast Fill		
Type D (Civic)	0.2			0.4				0.6
Type E (Prius)	0.2			0.5				0.7
CNG (Civic GX)	0.2		0.2				0.3	0.7
<b>Silver +</b>								
H2 ICE	0.2	1.5	0.3				0.3	2.3
PHEV 20 AER	0.2	1.25		0.5	0.2		0.15	2.3
PHEV 20 blended	0.2	1.0		0.5	0.2		0.15	2.1
PHEV 20 blended fast fill	0.2	1.0		0.5	0.2	0.1	0.15	2.2

As discussed in the previous topic, the ZER based on Urban AER discounts the blended mode operation, so AQMD staff believes a new cycle or definition needs to be included. As with the hydrogen ICE alternative ZER, a consideration should be made for blended mode PHEVs which operate a portion of the drive cycle on battery only and supplement the combustion engine with electricity.

The early introduction multiplier also needs to be balanced with the need to backfill using ATPZEVs as discussed in the previous topic.

#### Topic G: Calculation of NEV Credits

As proposed by staff, the NEV credit structure should be adjusted to better reflect their contribution to improved air quality but careful limitations on credit should remain to ensure

continued progress on other ZEVs with broader market applications. It is unclear how much NEVs contribute to reducing pollution in the South Coast Air Basin or the state as a whole.

Topic H: Intermediate Volume Manufacturers

AQMD staff agrees that intermediate volume manufacturers transitioning to large volume manufacturers should be allowed a pro-rated volume of ZEVs. However, AQMD staff again stress the need to preserve air quality benefits during this transition and ensure that ATPZEVs in the near-term are not sacrificed for future ZEVs.

Topic I: Travel Provision

AQMD staff recommends the current sunset date of 2012 for the travel provision be maintained. Based on the commercial readiness of the technology, it is likely that a delay in Phase IV will occur (Topic A). As such, the large volume manufacturers will be given an order of magnitude (2,500 vs. 25,000) reduction in vehicles to deploy. This reprieve should allow them to place all of the vehicles in California to ensure the cleanest vehicles are placed where they are needed most. If this cannot be accommodated, then the number of ATPZEVs based on useable energy should again be used to backfill the lost emissions benefits of the ZEV.

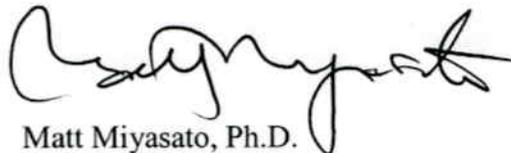
Topic J: Other Modifications

AQMD staff believes that additional credits should be allowed for vehicles with tailpipe emissions substantially below SULEV. The credits could be on a sliding scale proportional to the percent below SULEV.

In general, the credit structure needs to be more transparent to the public. This includes the number and amount of credit potentially garnered for each manufacturer and the number of banked credits as opposed to the existing percentage requirements. Any other methods to improve public understanding of the ZEV regulation would be very beneficial.

We hope you find these recommendations useful. AQMD staff remains ready and willing to work with CARB staff on these efforts and are available to discuss these suggestions at your earliest convenience. Please contact me or Lisa Mirisola at (909) 396-2638 if you have any questions on these recommendations.

Sincerely,



Matt Miyasato, Ph.D.  
Technology Demonstrations Manager  
Science and Technology Advancement

MMM:LHM